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Remarks

Applicants' attorney acknowledges with thanks the courtesy the Examiner extended to Messrs. Daage, Dvorak, Koveal and Marin at their November 18 interview. The substance of the issues discussed then is reiterated herein.

First, with respect to the rejection of claims 1 to 25 under the first paragraph of 35 USC 112 regarding the recital "oxidizing the impregnated catalyst" in claims 1, 19, 20 and 21, applicants note that the specification very clearly states that once the catalyst is impregnated it is oxidized in the presence of the impregnating solution (See for example paragraph [0033] ); and applicants submit that once the catalyst is impregnated it is an impregnated catalyst. Consequently the language objected to by the Examiner is in applicants view clearly proper. Nonetheless, in an earnest attempt to advance the prosecution of the application to a satisfactory conclusion, applicants have amended claims 1, 19, 20 and 21 to state that the catalyst of step b), i.e., the material after impregnation, is oxidized in the presence of the impregnating solution. This amendment obviates the rejection under 35 USC 112.

Claim 1 also was amended to correct an obvious typographical error.

Second, regarding the rejection of claims 1 to 25 under 35 USC 102(a) as anticipated by Lapidus, applicants respectfully request the Examiner to reconsider and withdraw that rejection.

It is well settled that for a proper rejection of a claim under 35 USC 102 each and every element of the claim must be expressly or inherently found in a single reference (Verdegaal Bros. v. Union Oil Co. of California, 814 F2d 628, 2 USPQ 2d 1051 (1987) in the same detail as in the claim (Richardson v. Suzuki Motor Co., 868 F2d 1226, 9 USPQ 2d 1913 (1989)) and with the elements arranged as required by the claims (In re Bond 910 F2d 831, 15 USPQ 2d 1566 (1990). For reasons detailed below,

applicants submit that Lapidus fails to expressly or inherently describe the invention in the same detail and arrangement as set forth in applicants' claims.

Applicants' claim 1 has as a first step decreasing the hydrocarbon content of a used catalyst. Claims 2, 19, 20 and 21 list very specific steps for decreasing the hydrocarbon content, e.g., treating with a hydrogen containing gas at elevated temperature; contacting it with a solvent or super critical fluid, etc.

Lapidus clearly does not disclose applicants' first step of decreasing the hydrocarbon content of a used catalyst. Instead Lapidus discloses activating a spent catalyst by first treating the spent catalyst with a solution of a chelating compound. The Examiner contends that such treatment would inherently decrease the hydrocarbon content of the spent catalyst. Applicants submit however that the preferred water or molten wax taught by Lapidus as a solvent for his chelating agent will not inherently reduce the hydrocarbon content of the spent catalyst<sup>1</sup>; nor is treatment with a chelating agent a disclosure of contacting the catalyst with any of the more specific treatments in claims 2, 19, 20 and 21.

Applicants' second step is impregnating the catalyst of step (a) with a solution of an ammonium salt under a non-oxidative atmosphere. As applicants point out in their specification (page 16, lines 6-11) this step is believed to result in a redispersion of the catalyst metal. In any event, Lapidus does not disclose impregnating a hydrocarbon decreased, spent catalyst with ammonium salts in non-oxidative atmosphere. Lapidus clearly teaches treating the spent catalyst with a solution of a chelating compound to leach the catalyst metal. Leaching is not equivalent to impregnating. Note that in Examples 1 and 2 Lapidus slurries the catalyst with an aqueous solution of EDTA with no restriction as to atmosphere, and then filters the

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<sup>1</sup> The hydrocarbons deposited on spent catalyst are insoluble in water and use of molten wax will leave wax, i.e., hydrocarbons on the catalyst.

slurry to extract the chelated cobalt<sup>2</sup>. This is not a disclosure or suggestion of applicants' claimed method because applicants' do not remove catalytic metal by removing the impregnating solution. Instead applicants proceed to a third step.

Applicants' third step is to oxidize the catalyst of its step b in the presence of the impregnating solution. Lapidus does not disclose such a step. Lapidus teaches "... in the preparation of a fresh catalyst ..." (Col. 4, line 2, emphasis added) that (1) the support is impregnating with the catalytic metal salt (Col. 4, lines 4 to 65) and then (2) the impregnated support is oxidized (Col. 5, lines 17-22)<sup>3</sup>. However, when dealing with an inactive catalyst Lapidus states "an inactive or deactivated catalyst ... is (4) activated by contact, and treatment with a chelating compound ..." (Col. 5, lines 28 to 31) and that "(5) The catalyst ... after extracting with the chelating agent is reduced ..." (Col. 6, lines 39 to 40). Thus, the oxidation step with respect to a fresh catalyst is not taught or suggested with respect to the spent catalyst.

The difference between Lapidus and applicants' catalyst processing steps provides significantly different results. As the accompanying chart shows activation of a deactivated catalyst according to applicants' process (Examples 8 and 9 on the chart) results in a catalyst whose CO consumption in use is 1826 and 1994 gms/hr/liter catalyst, respectively. In contrast, the activated catalyst of Lapidus has a CO consumption of 30 gms/hr/liter of catalyst. This difference is truly remarkable.

For reasons set forth in considerable detail above, Lapidus fails to expressly or inherently disclose each and every element in the same detail and order of applicants' claimed invention. As a consequence, applicants' claims are patentable over the reference and applicants' request the application now be passed to issue.

<sup>2</sup> Lapidus needs to remove some  $\text{Co}_3\text{O}_4$  from the pores of the support to achieve suitable activity (Col. 3, lines 20 to 35).


<sup>3</sup> See also Example 1 where a catalyst is prepared by impregnating a support, drying and then calcining.

Example	4	5	6	12	8	9	17	Ney, Ex. 2 Impregnation of solution of metal on support	Ney, Ex. 4 Impregnation of solution of metal on support	Lapidus, Ex. 1 Impregnation of solution of metal on support	Lapidus Ex. 2,3,4 Impregnation of solution of metal on support
Step 1											
Step 2		High Temperature Dry Oxidation		High Temperature Dry Oxidation				Dry	Dry	Dry	Dry
Step 3				Impregnation in inert atmosphere with aqueous ammonium acetate and ammonia				High Temperature Dry Oxidation	High Temperature Dry Oxidation	High Temperature Dry Oxidation	High Temperature Dry Oxidation
Step 4				Low Temperature Oxidation in presence of impregnated solution	Low Temperature Oxidation in presence of impregnated solution	Low Temperature Oxidation in presence of impregnated solution	Low Temperature Oxidation in presence of impregnated solution		High Temperature Dry Oxidation		Leaching with NaMEDTA solution
Step 5				Dry and Calcine	Dry and Calcine	Dry and Calcine	Dry and Calcine				Filtration (8, 10, or 12% Co remaining on support)
Step 6											Dry
Step 7											
CO Conversion, %	27.3	55	55.1	58.5	73.9	80.7	82.1	74.2	80.4	65	72
CH4 Selectivity, %	7.6	10.9	9.5	6	7.7	6.5	7.1	7.8	7.6	NA	NA
GHSV, 1/hr	6010	6010	6010	6010	6010	6010	6010	1000	1000	100	100
H2/CO	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.07	2.07	2	2
CO Consumption, grams/liter catalyst	675	1859	1862	1470	1828	1994	2029	302	358	27	30
% Improvement	Base	101	102	118	171	196	201	Base	22	Base	11

	Cobalt Oxide		Cobalt Sulfate		Mixed Cobalt Oxide and Sulfate
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Respectfully submitted,



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☒ Pursuant to 37 CFR 1.34(a)

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